

# DEPRESSION IN SICKLE CELL DISEASE

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**Purpose:** To assess the prevalence of depressive symptoms and examine the contribution of demographics, disease severity, and health care use variables to depressive symptoms in sickle cell patients who had been in Stable health for at least one month.

**Patients and Methods:** Subjects were a convenience sample of 27 men and 23 women selected during a routine visit to the sickle cell clinic at Howard University Hospital. Depression was assessed using a cut-off score from the Beck Depression Inventory (BDI) and related to a variety of health outcomes.

**Results:** The results of the analyses indicate that 44% (n=22) of the sample scored within the mild to severe (>20) range of depression on the BDI. Depressed sickle cell patients were more frequently treated in emergency rooms and more likely to be hospitalized with vaso-occlusive crises. Patients more likely to be depressed were: those with low family income (<\$ 10,000); less than high school education; female; those who had multiple blood transfusions; poor pain control; inadequate social support; hydroxyurea use; and had histories of frequent vaso-occlusive crises.

**Conclusion:** The prevalence of depressive symptoms in sickle cell patients is high compared to the general African American population. Our findings confirmed previous studies examining the occurrence of depression in adults with sickle cell disease. Treatment of depression should be strongly considered to improve the quality of life and probably disease course in sickle cell patients. (*J Natl Med Assoc.* 2003;95:533-538.)

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**Key words:** depression ♦ sickle cell disease  
♦ BDI ♦ abstract

Depressive symptoms are very common in patients with chronic medical conditions. As the symptoms overlap, clinicians often fail to recog-

nize the presence of depression. Significant numbers of patients with sickle cell disease have depression.<sup>1-3</sup> This may be a result of the constant demands of the illness or intrusive treatments. The combination of depression and chronic medical illnesses, such as sickle cell disease, decreases the quality of life and results in increased morbidity and mortality.<sup>4,5</sup>

Sickle cell disease is an autosomal recessive disorder in which structurally abnormal hemoglobin HbS leads to chronic hemolytic anemia and to a variety of severe clinical manifestations.

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The disorder is caused by a point mutation. A single DNA base change leads to substitution of valine for glutamic acid in the sixth position on the beta globin chain. Approximately 8% of African Americans carry the sickle cell gene. People who are heterozygous for hemoglobin S (sickle cell trait-HbAS) are asymptomatic. The homozygous state (sickle cell anemia-HbSS) exists in approximately 0.15% of African Americans. The disease is severe and results in significant morbidity, as well as shortened life span. Patients have a life-long, often severe anemia, frequent vaso-occlusive crises and develop complications such as acute chest syndrome, infections, strokes, seizures, priapism, fat embolization, pulmonary hypertension and embolism, deep venous thromboses, retinopathy, renal failure, gallstones, liver disease and bone infarctions. There is considerable variability in the clinical course of sickle cell disease with some patients experiencing few to no complications and others having multiple organ involvement.<sup>6</sup>

The literature suggests that a significant number of patients with sickle cell disease experience social and psychiatric problems. In one of the first reports of depression and sickle cell disease, Morin and Waring presented case studies of three patients with sickle cell disease.<sup>7</sup> They suggested that depression occurs more frequently in sickle cell disease than previously suspected. Morgan and Jackson reported significantly higher depression scores in adolescent patients with sickle cell disease than their healthy peers.<sup>8</sup> Belgrave and Molock in a study of 46 adult patients with sickle cell disease found that 56.5% of the sample was identified as being mildly to severely depressed using the Beck Depression Inventory (BDI).<sup>9</sup> Thompson et al., in a larger study of 109 adult patients with sickle cell disease, examined the occurrence of depression and other psychological problems. Fifty-six percent of the sample met criteria for poor psychological adjustment, with 40% having depression.<sup>10</sup>

Several studies indicate that the increased

risk for depression in sickle cell disease is similar to that for other chronic medical illnesses.<sup>1,2</sup> Some authors have indicated the lack of a consistent relationship between depression and sickle cell disease.<sup>2,11,12</sup> Depression associated with sickle cell disease has been thought to result from chronic pain and other illness-related symptoms. Many of the symptoms of depression include low self-esteem, feelings of inadequacy and inferiority, low energy, insomnia, anorexia, and weight loss often accompany chronic pain or recurrent pain episodes. However, Morgan and Jackson showed a higher incidence of depression in these patients even after accounting for illness-related physical symptoms.<sup>8</sup>

Depression has been found to affect the medical outcomes of patients with sickle cell disease. Leavell and Ford suggested a relationship between medical complications and psychopathology in patients with sickle cell disease.<sup>13</sup> Nadel et al. noted the onset of painful crises was preceded by different types of losses and accompanying depressive affect in 50% of the sickle cell patients in their study.<sup>3</sup> In chronically depressed sickle cell patients, increased frequency of vaso-occlusive crises and other complications were observed more often during depressed periods than during stable periods. Other patients in the study had crises onset following the onset of depression.

Damlouji et al. didn't notice any relationship between impaired social and psychiatric functioning and the presence or absence of physical complications in sickle cell patients.<sup>2</sup> Since the introduction of hydroxyurea in 1992, the severity and frequency of vaso-occlusive crises and other complications have decreased substantially. Most of these moderately to severely ill sickle cell patients were prescribed hydroxyurea. Previous studies examining the prevalence and severity of depression in sickle cell patients were conducted prior to introduction of hydroxyurea. The purpose of this study was to assess the prevalence and to examine the contributions of specific variables to depression in patients with

sickle cell disease who have been in stable state for at least a month.

## MATERIALS AND METHODS

Fifty African American patients with sickle cell disease were selected and screened during their clinic visits to the Howard University Hospital in Washington, DC, from January 1 to December 31, 2001. The study subjects were adults with sickle cell disease without any episodes of vaso-occlusive crises for at least a month. The data collected included demographic (age, gender, marital status, level of education, employment, household income), types of hemoglobinopathy, disease severity, pain, and health care use.

Questionnaires were administered to patients during outpatient clinic visits. Patients complaining of pain, discomfort, or appeared sick in the clinic were not given the questionnaires. Medical records were reviewed for additional information. Permission from Institutional Review Board was obtained prior to initiation of the study and all patients gave their written informed consent before enrollment. The Beck Depression Inventory (BDI) scale was used to measure depression. The BDI is a 21-item test that measures the presence and degree of depression in adults. It has commonly been used for measuring depression in patients with a variety of selective chronic illnesses. The BDI has demonstrated high internal consistency, concurrent validity with other measures of depression, and construct validity with psychological, behavioral, and attitudinal variable related to depression.<sup>14</sup> The predictor variables were depression and demographics, disease severity and health care use variables, as well as presence or absence of sickle cell related complications, number of vaso-occlusive crises, emergency room treatments and hospitalizations in the last one-year period, Hydroxyurea use, number of blood transfusions, social support, and compliance with treatment. The chi-square test was used for statistical analysis.

## RESULTS

The study sample consisted of 27 men and 23 women. The age of the subjects ranged from 21 to 64 years with a mean age of 36 years. Twenty-six percent (13) of the subjects were married, 8% (four) were separated and 66% (33) were never married. Thirty-eight percent (19) of the sample had a high school education or higher. Only 18% (nine) of the patients were employed. Fifty-eight percent (29) reported a household income of less than \$20,000. Ninety-four percent (47) had SS phenotype, 4% (two) had SC, and 2% (one) had S- $\beta$ -thalassemia.

Twenty-two (44%) sickle cell patients scored within the mild (BDI score 14 to 17) to severe (BDI score >20) range of depression on the BDI. Fifty-six percent scored within the normal range. Thirteen patients were severely depressed (BDI score >20). Overall, variables such as gender (being female  $p=0.03$ ), number of blood transfusions (>20 units,  $p=0.03$ ), hospitalizations (>5 in previous year,  $p=0.0003$ ), emergency room treatments (>5 visit in previous year,  $p=0.03$ ), level of education (less than high school,  $p=0.04$ ), frequency of crises (>5 in previous year,  $p=0.001$ ), social support (poor,  $p=0.02$ ), hydroxyurea use ( $p=0.03$ ) and family income (<10,000 per annum,  $p=0.001$ ) significantly predicted the likelihood of depressive symptoms. Marital status, drug, alcohol or tobacco abuse, phenotype, family psychiatry history, compliance, complications of sickle cell disease and employment status were not significant predictors ( $p>0.05$ ) of depression in these patients.

## DISCUSSION

The primary goal of this study was to assess the prevalence of depressive symptoms in patients with sickle cell disease. Though the sample was selected for absence of acute illness, the results of this study concur with previous studies. The prevalence of depression is higher in sickle cell patients than healthy peers. The results also suggest the prevalence of depressive symptoms in sickle cell patients is at par with the prevalence of depression in patients suffering from other chronic diseases.

The second goal of the study was to examine demographic variables, disease severity, health care use, social support and compliance with the treatment factors related to depressive symptoms. The results revealed several factors to be associated with the symptomatic depression. Those with poor social support and less than high school education were more likely to be depressed than those sickle cell patients who had good social support and high school or higher education. The association of low family income, and gender (female) with increased prevalence of depressive symptoms even after controlling for disease severity, concurred with the findings by Schaeffer and colleagues. Leavell and Ford in contrast observed more psychological problems in 16 male adult sickle cell patients.<sup>13</sup>

Those who had multiple transfusions, more than five hospitalizations and/or emergency room visits for crises were more likely to be depressed. Hydroxyurea users were more likely to be depressed than those patients who didn't use hydroxyurea. These variables reflect their disease severity. These data are not consistent with the studies by Schaeffer et al. and pediatric SCD literature,<sup>15</sup> which suggest that the adjustment problems observed are more like due to low socioeconomic conditions than having a severe disease.

Thus, depressive symptoms in patients with sickle cell disease appear to be a function not only of demographics but also of disease severity. There is clinical relevance to these research findings that depressive symptoms correlates with an increase in symptomatic expression of sickle cell disease. Molock and Belgrave<sup>16</sup> proposed that when there is evidence of poor psychological adjustment in patients with sickle cell disease, the role of socioeconomic status needs to be explored, since factors such as financial difficulties, racial discrimination, and lack of social support are known to contribute to depression in physically healthy African Americans.<sup>17</sup> Social support network should be assessed and social services should be mobilized to provide adequate support. A close physician-patient rela-

tionship is in itself a positive asset in the patient's social support network.

There were limitations to this study. Although the BDI is a valid instrument for measuring degree of depression, a structured diagnostic clinical interview, such as the Hamilton Depression Scale, would have identified individuals meeting criteria for clinical depression.

Depressive symptoms may have behavioral, physiological, cognitive, motivational and affective components in sickle cell patients. These may manifest as increased somatic complaints, lack of concentration and appetite, irritability, fatigue, hopelessness, guilt, suicidal ideation, loss or gain of weight, indecisiveness, insomnia, sadness, social withdrawal and many other non-specific complaints. The depressive symptoms often complicate chronic pain. This may in turn lower the threshold for and tolerance of pain, and may interfere with ability to cope with pain. Adequate and prompt pain management, therefore, can abort a severe crisis and ameliorate depressive symptoms.

The analgesic benefits of antidepressants and the efficacy of antidepressants in treating depression should be utilized in these patients. A cognitive behavioral technique has been found to be quite successful in clinically depressed populations, and therefore should be explored in depressed sickle cell patients. The use of such interventions might help to improve depressive symptoms in these patients and thereby decrease pain, health care utilizations and improve quality of life.

## CONCLUSION

The prevalence of depression in sickle cell patients was high compared to the general African American population. Our findings confirmed previous studies examining the occurrence of depression in adults with sickle cell disease. The depressive symptoms in patients with SCD appear to be a function of demographics, pain control and disease severity. The high number of hospitalizations in the previous year, frequency of vaso-occlusive crises and low family income are most significant

independent predictors of depressive symptoms in sickle cell patients. Depression contributes to more severe clinical course and vice versa. Antidepressants and/or therapy should be strongly considered to improve the quality of life and probably modify the disease course.

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